

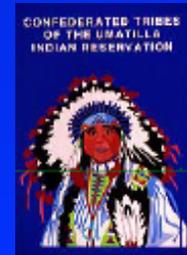
Reproductive success of hatchery-reared spring Chinook (*O. tshawytscha*) in Catherine Creek (Grande Ronde basin)



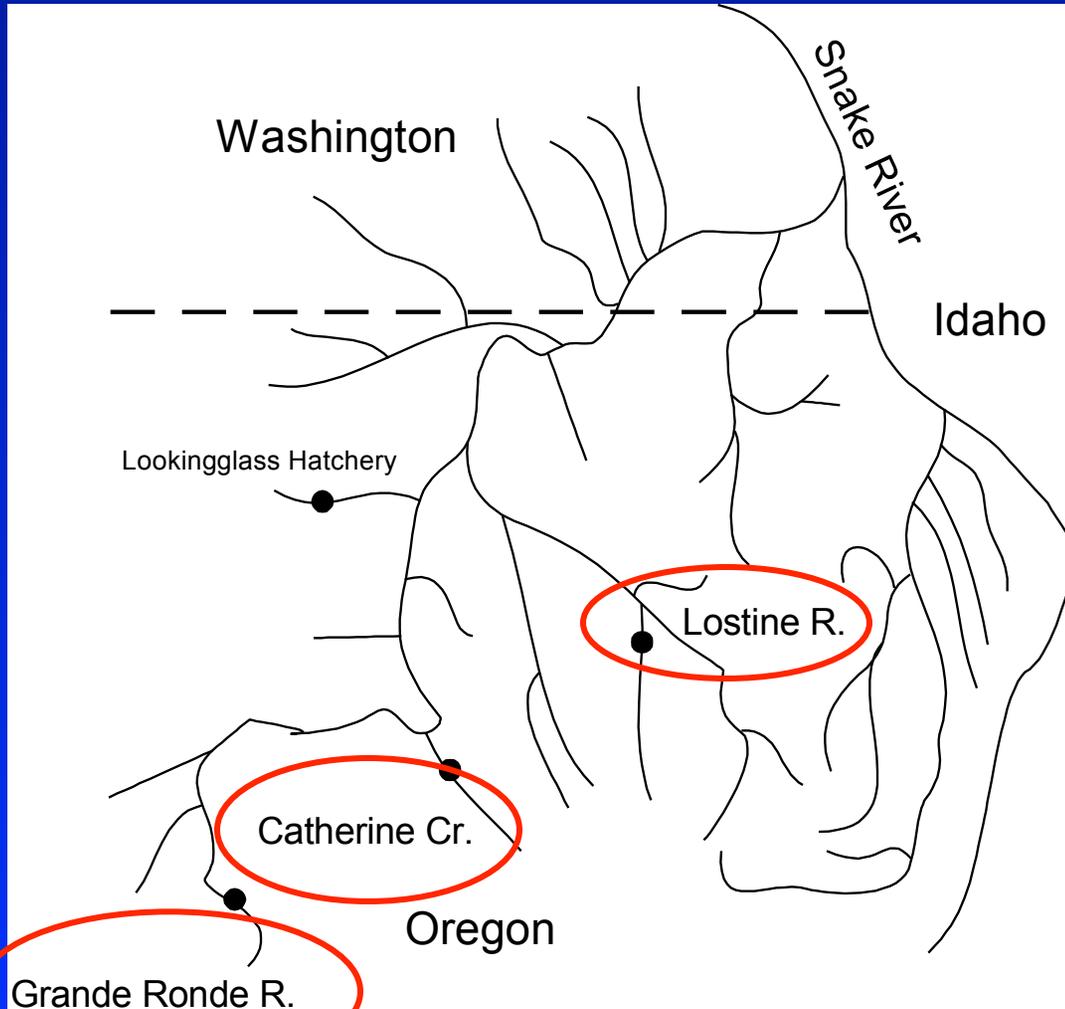
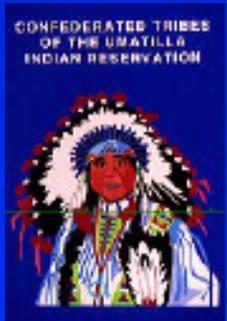
Ewann Berntson¹, Richard Carmichael², Robin Waples¹, Paul Moran¹

¹ National Marine Fisheries Service, Northwest Fisheries Science Center

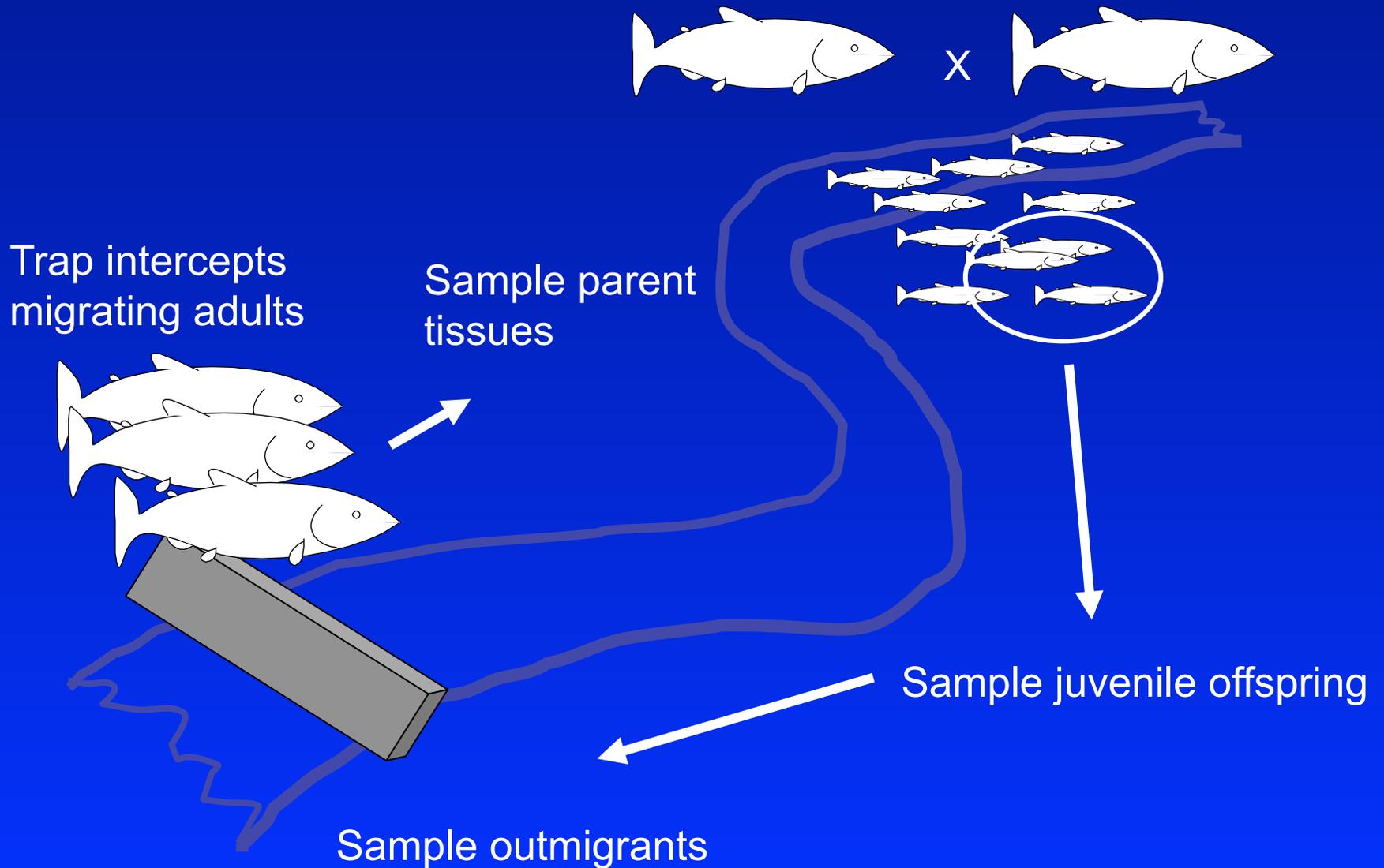
² Oregon Department of Fish and Wildlife



Northeast Oregon captive broodstock programs



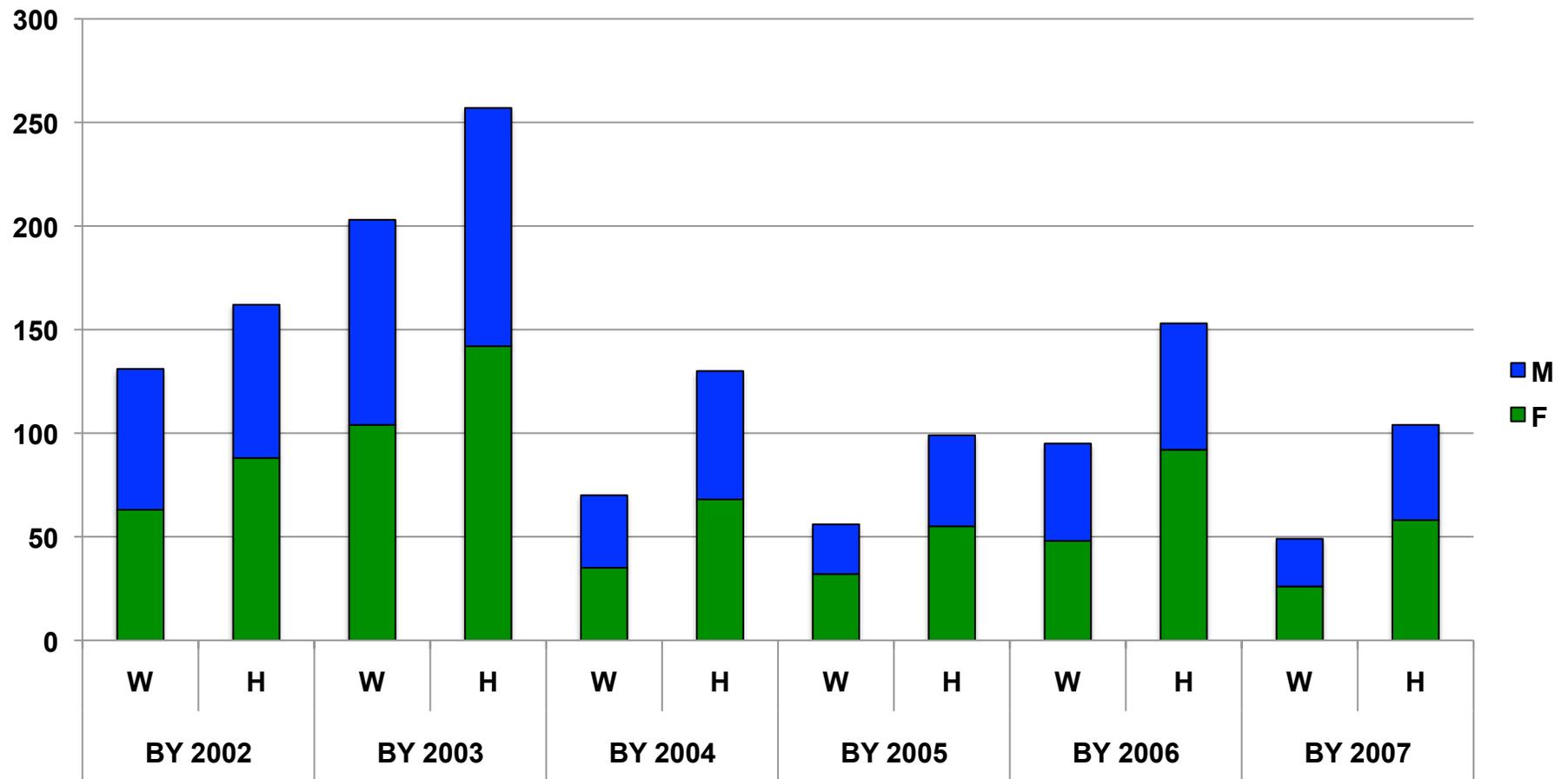
Pedigree project sampling



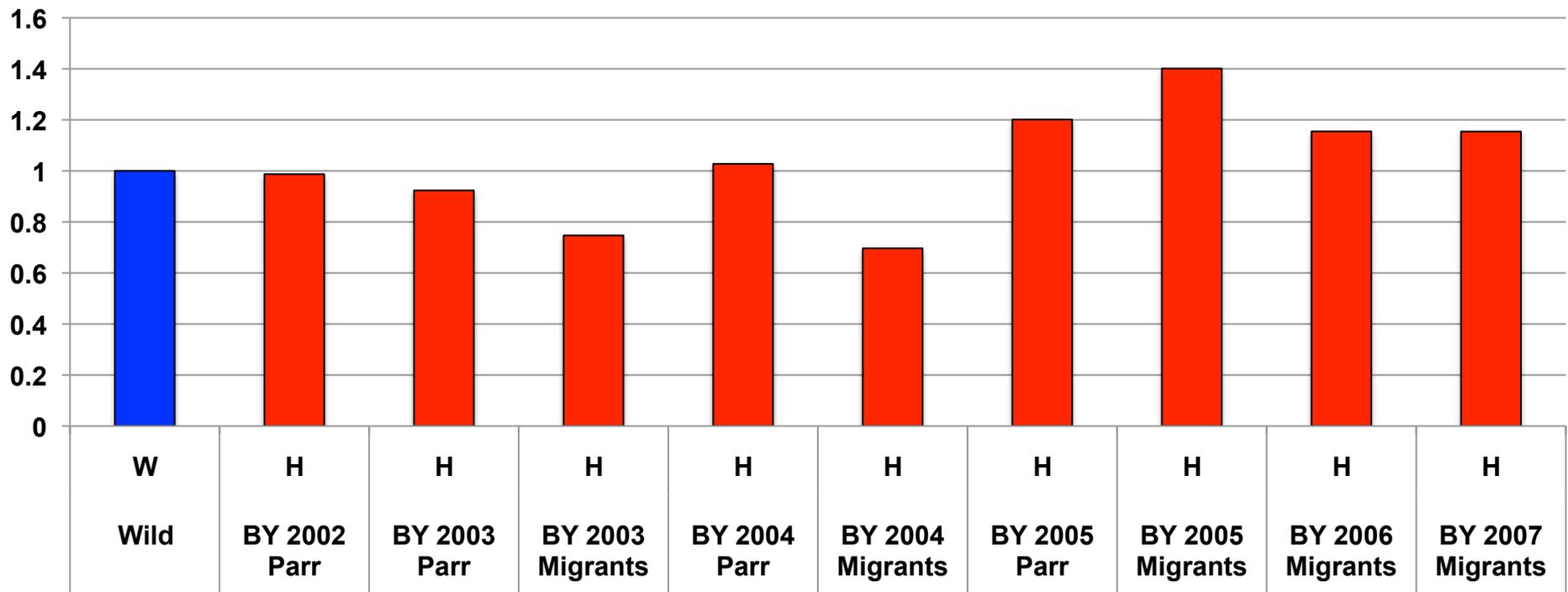
Pedigree analysis

- Genotyped for 10 microsatellites
- Pedigrees reconstructed by exclusion
- Relative Reproductive Success (RRS) calculated, normalized to wild
- *Generalized Linear Modeling to determine which phenotypic factors are most important for RRS.*

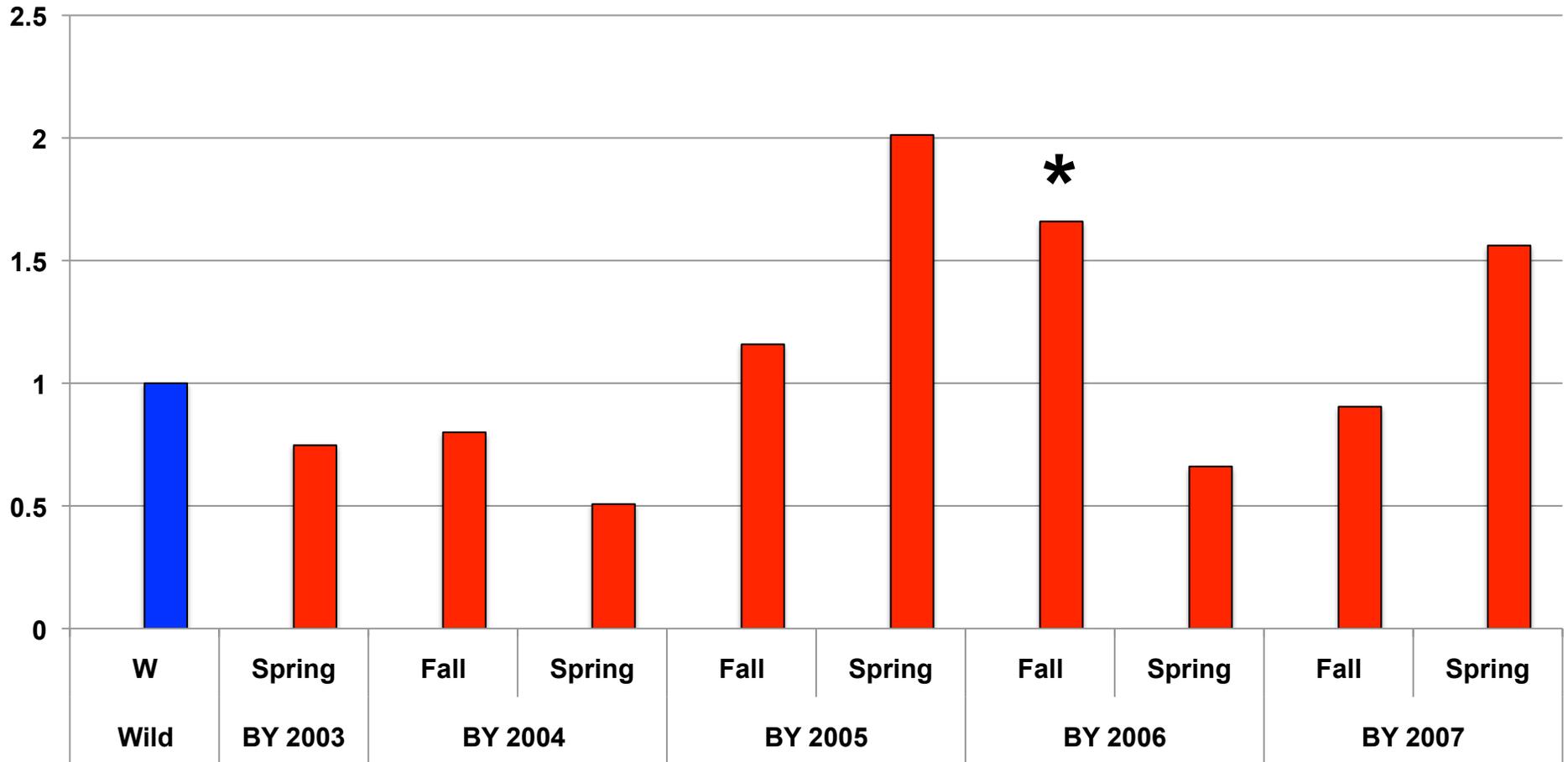
Catherine Creek returning adults passed over the weir



Juveniles (by origin)

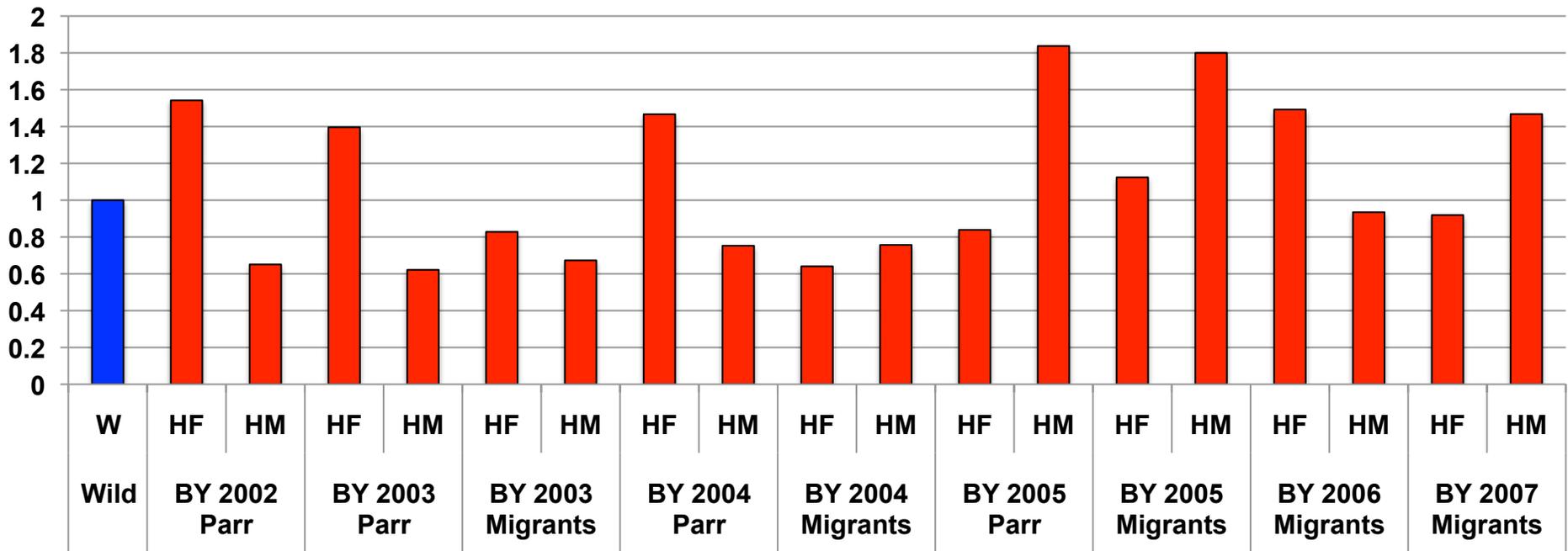


Fall and spring migrants (by origin)

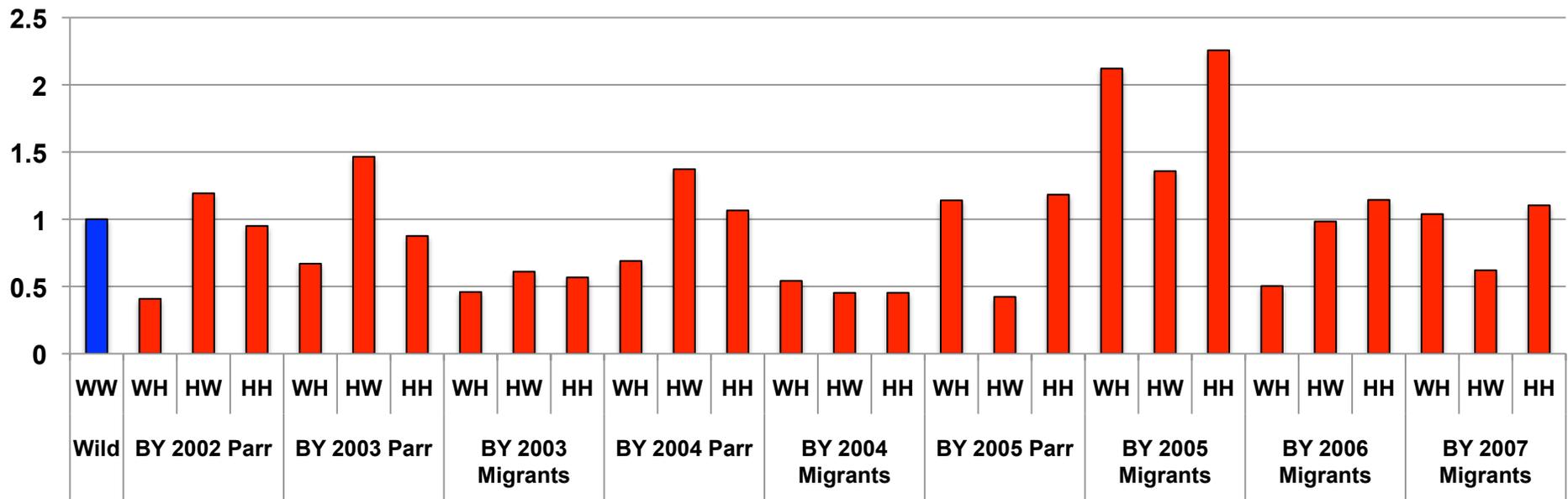


$p = 0.006$

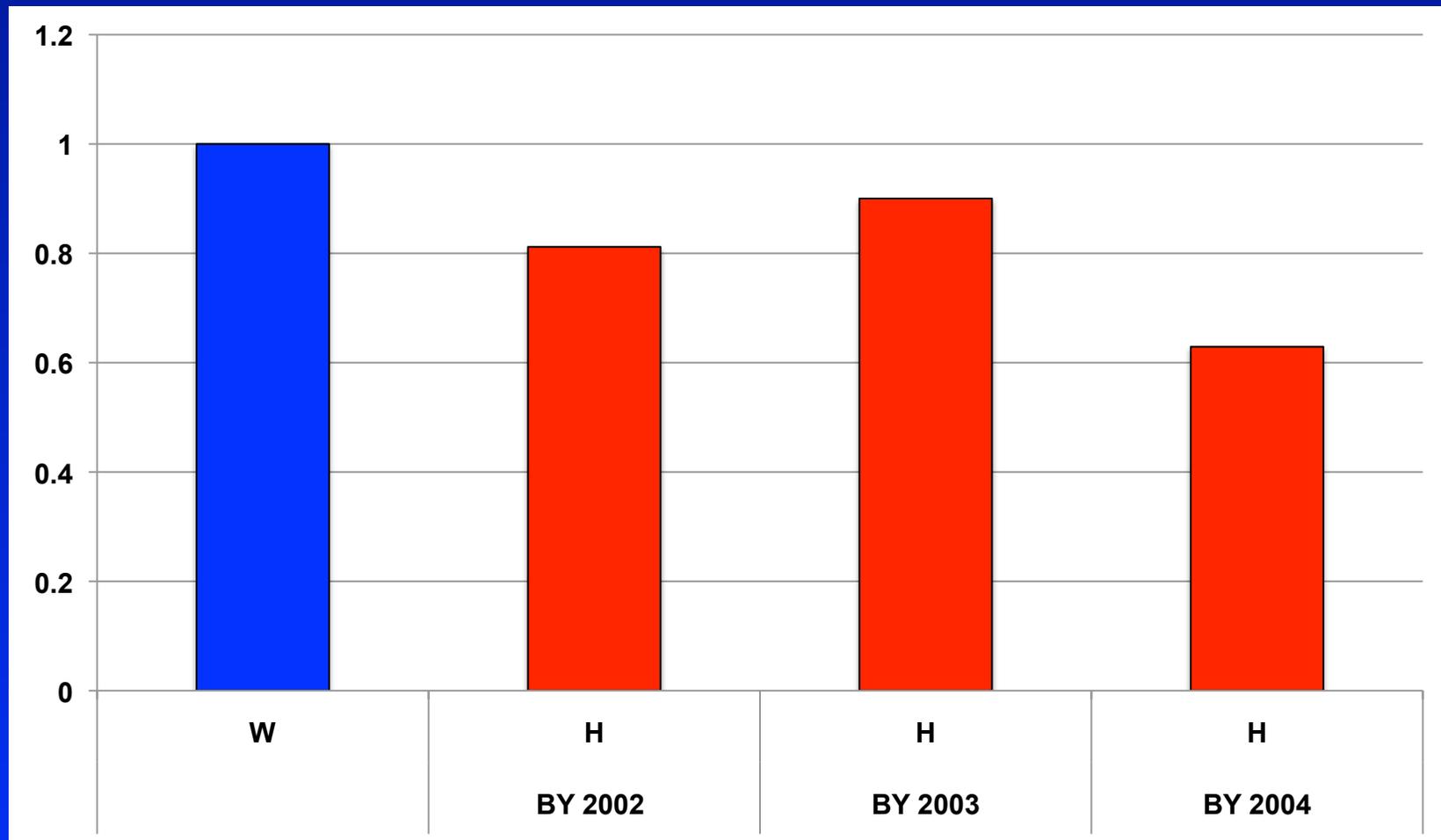
Juveniles (by sex/origin)



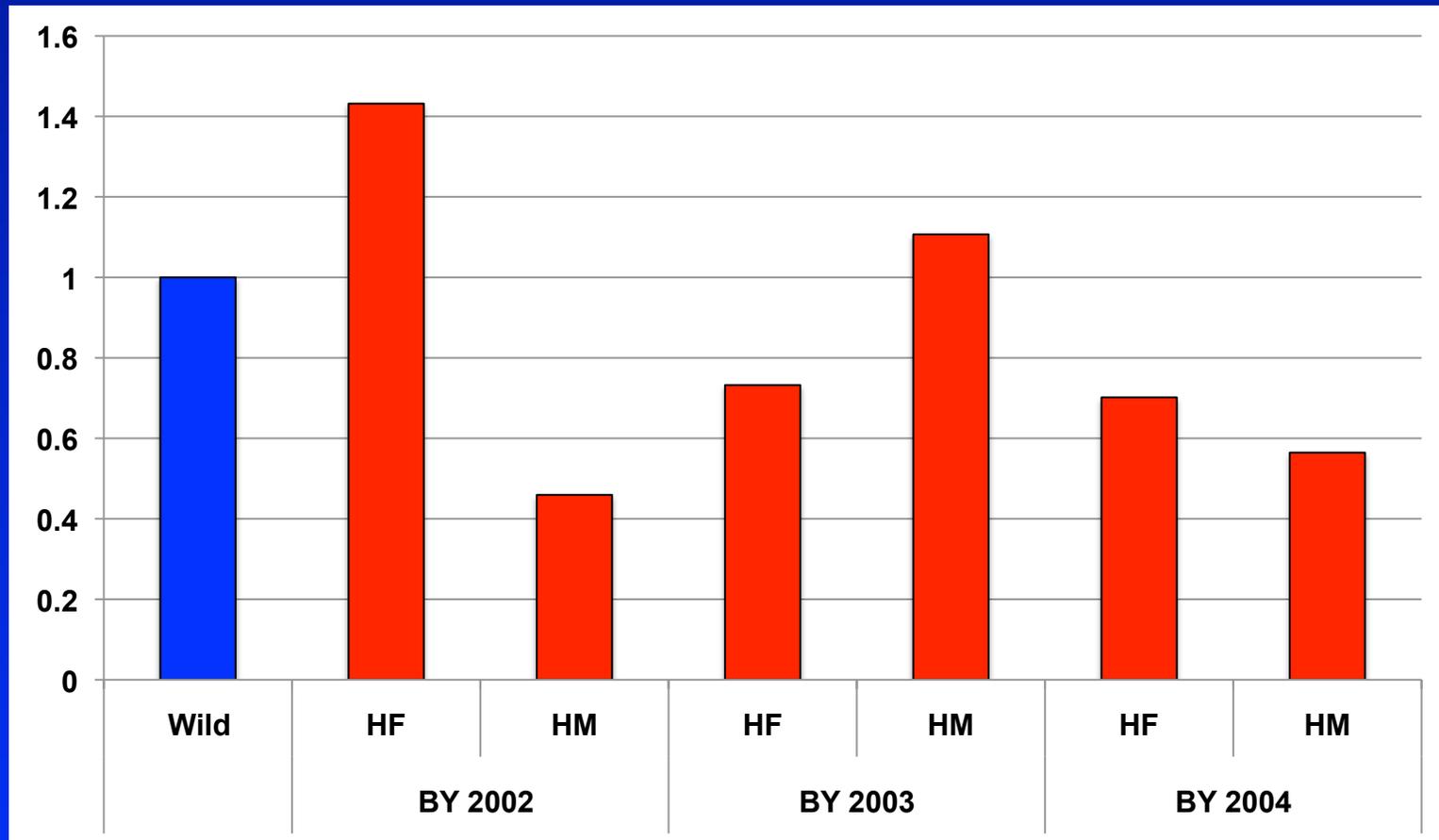
Juveniles (by matings)



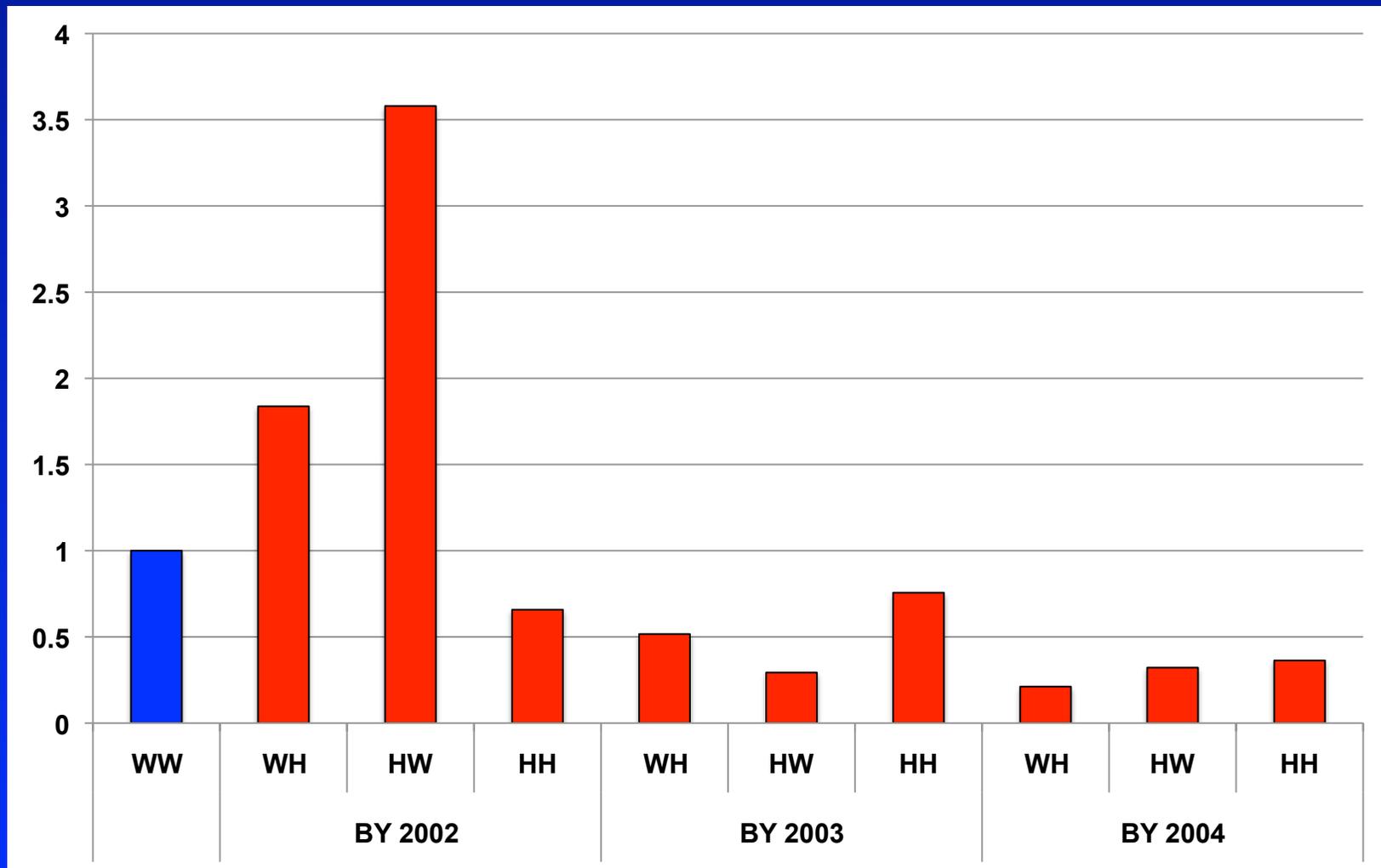
Adult-to-Adult (by origin)



Adult-to-Adult (by sex/origin)



Adult-to-Adult (by crosses)



Adult vs. juvenile results?

- Low numbers of wild adults for analysis
- Easier to get large numbers of juveniles
- Different RRS?
 - Parr = 1.03
 - Migrants = 1.00
 - **Adults = 0.77**

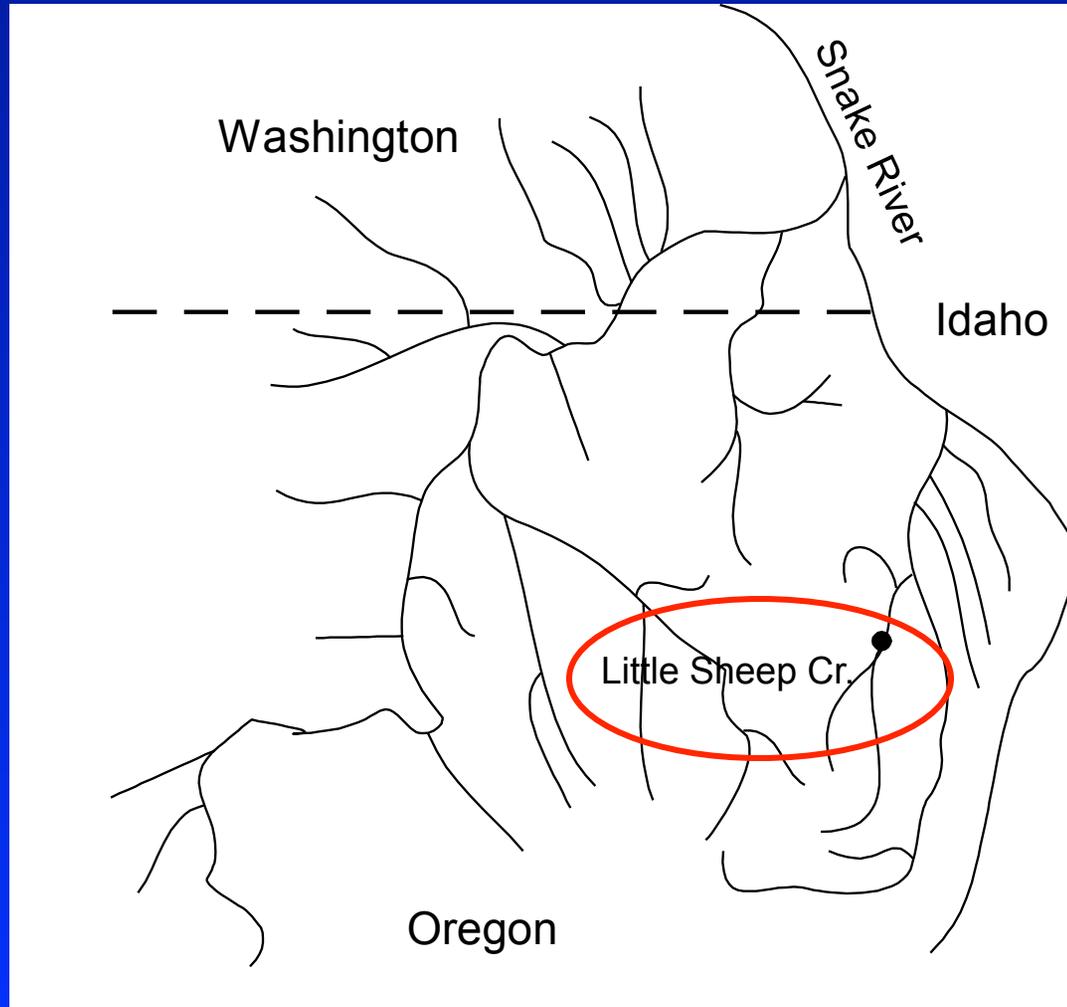
Jacks

- Jacks found in relatively low numbers
- They do contribute
- Lower RS than expected, but some individuals have higher RS
- Suggests a large variance in RS for jacks

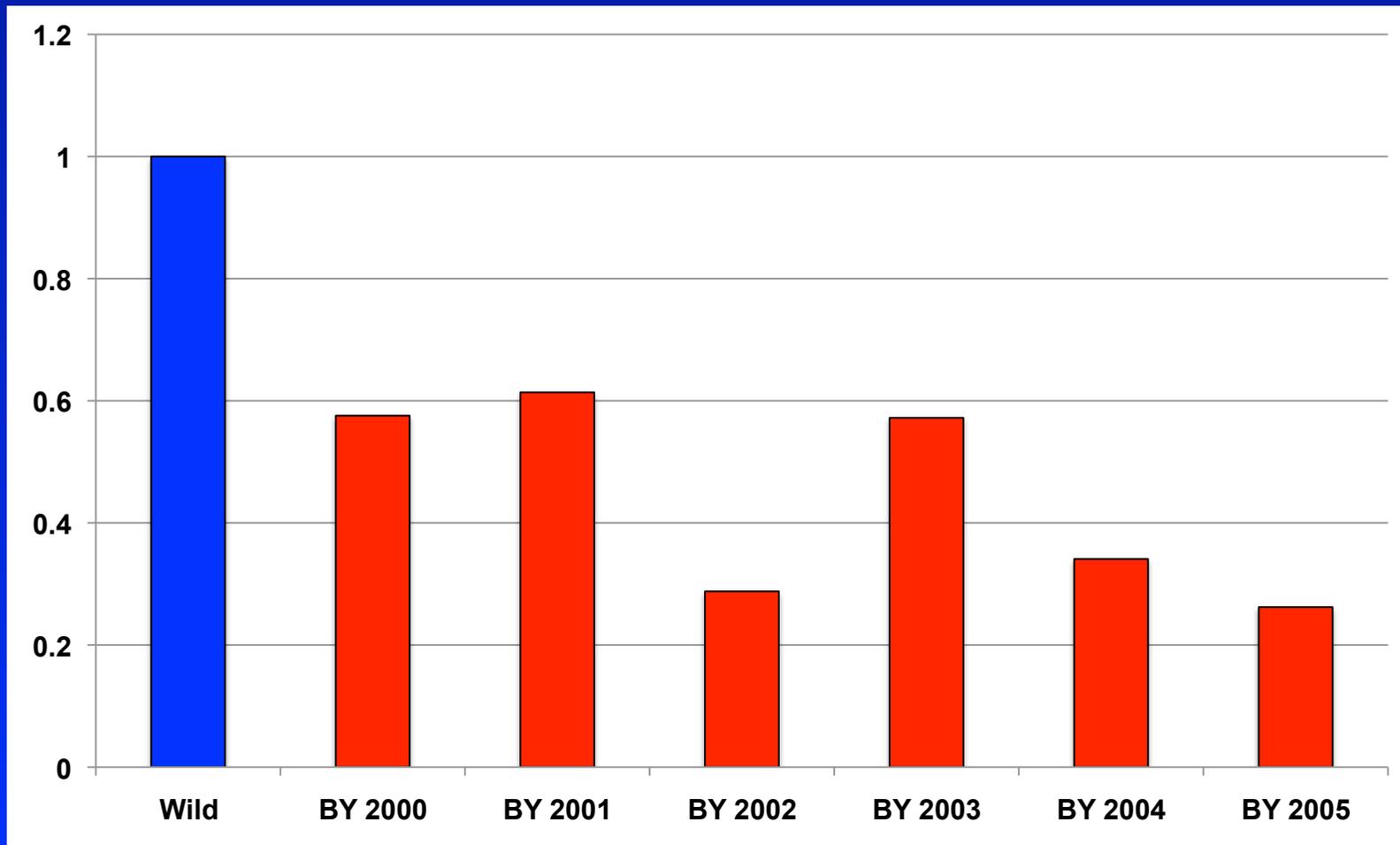
Precocial parr

- Approximately 90 caught in smolt trap in 2005, 40 in 2007, 6 in 2008.
- Nearly all were 2-year-olds
- Found both their parents and offspring
- *Do particular families produce PP?*

Little Sheep Creek steelhead program



Little Sheep RRS, Adults (by origin)



Results of Chinook pedigree study

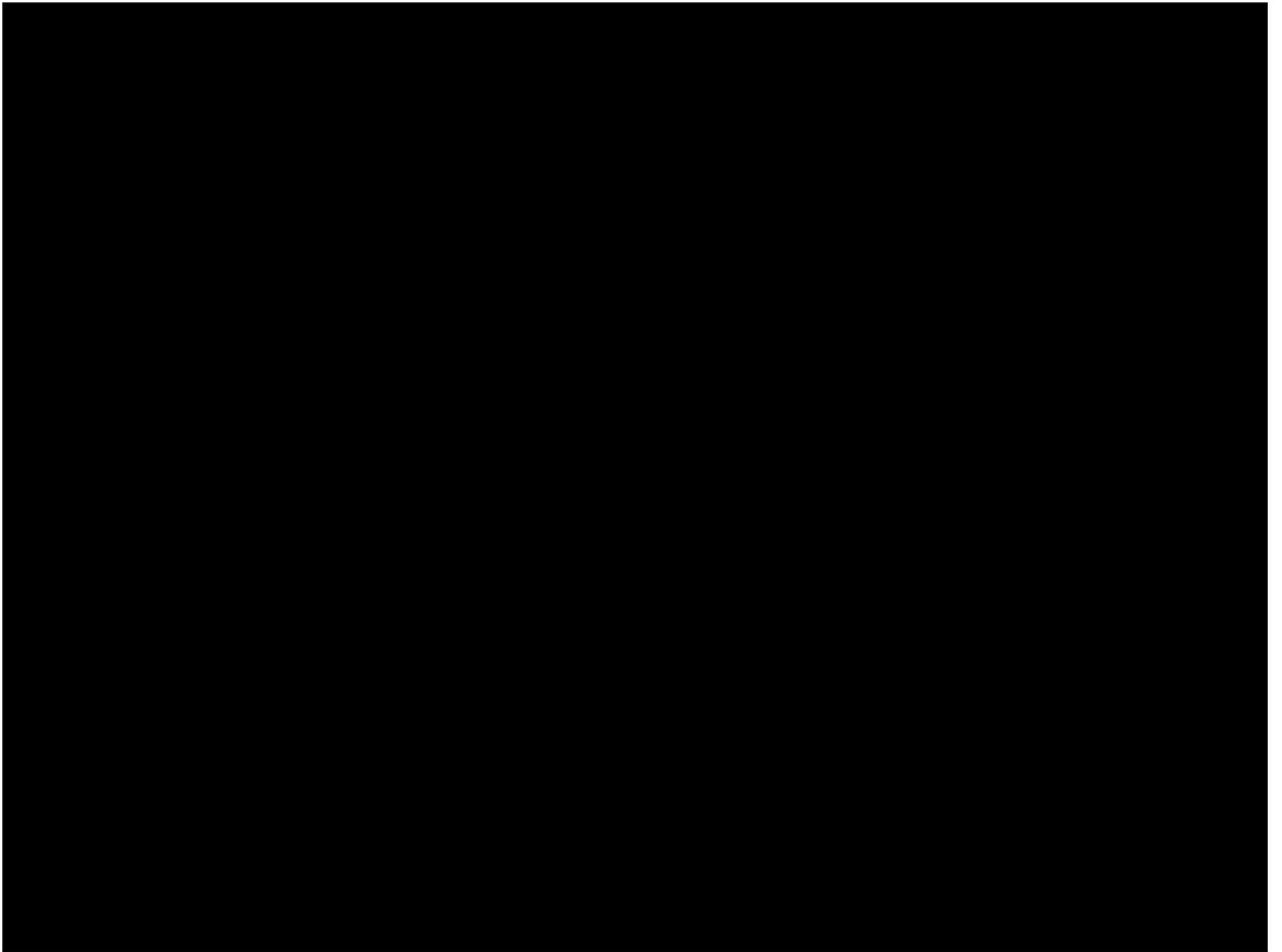
- Approximately equal RRS seen across years between hatchery and wild fish in Catherine Creek
- Jacks do contribute, but less than expected by number over the weir
- Precocial parr also contribute
- Very different from neighboring steelhead population

Next steps

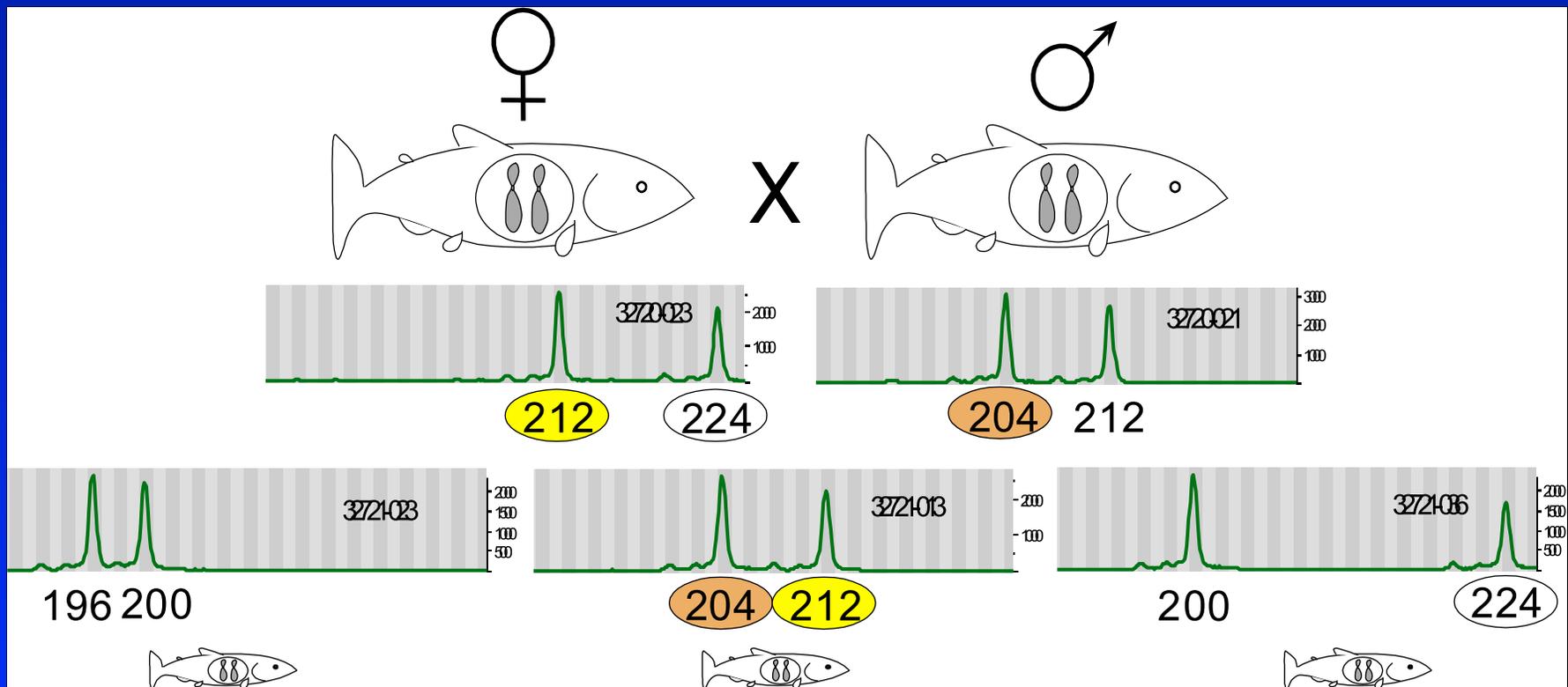
- Modeling of phenotypic characters of successful spawners
- Effective population size vs. census size
- Why such big differences between species and systems?
 - Acclimation sites?
 - Accelerated rearing?
- Adult vs. juvenile results

Acknowledgements

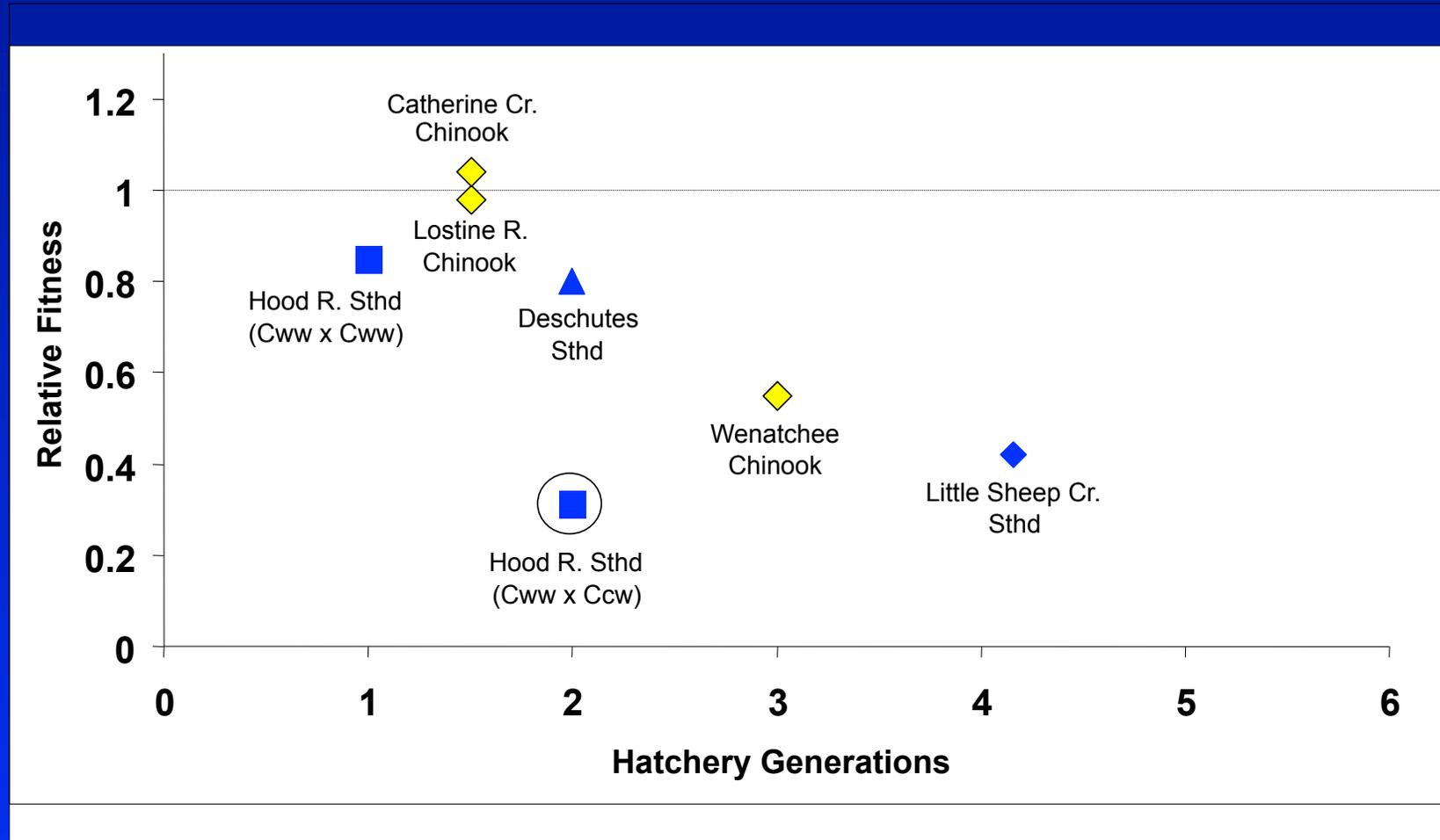
- This project was funded through BPA contract # 198909600
- Sampling, fieldwork and abundant local knowledge from ODFW, CTUIR



Pedigree analysis match-up



Supplementation programs in the Columbia River basin

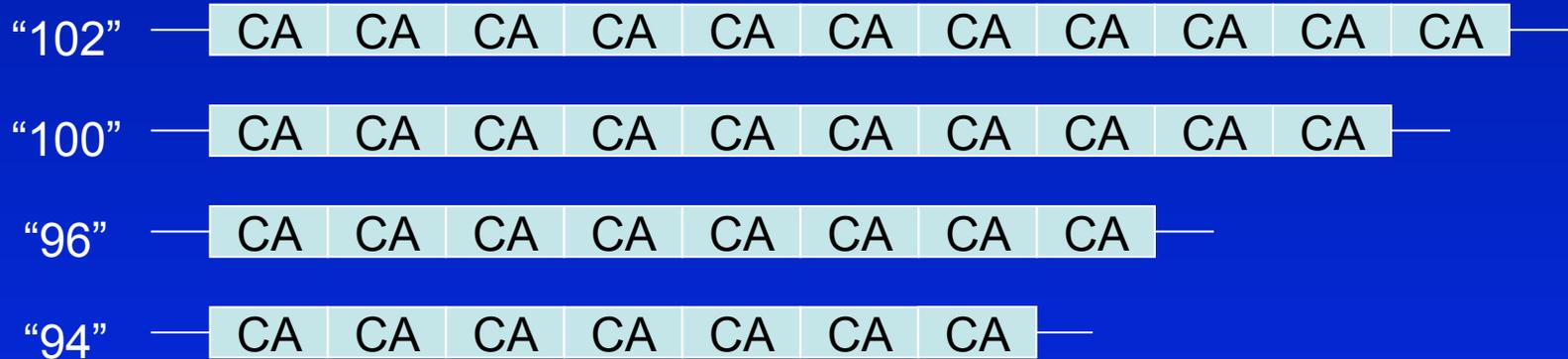


Triangles = egg-to-parr/smolt, **Diamonds** = adult-to-parr/smolt, **Squares** = lifetime

Species: *Dark blue* = steelhead, *yellow* = Chinook

Microsatellite markers—simple sequence repeats

Allele designations typically related to fragment size



Example of microsatellite genotypes

